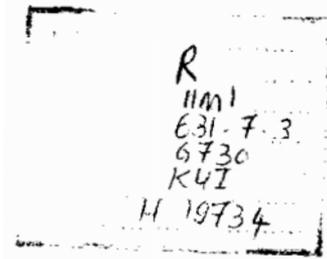


APPLYING RAPID APPRAISAL OF AGRICULTURAL KNOWLEDGE SYSTEMS (RAAKS) FOR BUILDING INTER- AGENCY COLLABORATION

Report on three RAAKS studies In the project
'Managing Irrigation for Environmentally Sustainable
Agriculture in Pakistan'



by

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Honesty

*Honesty is transparency
It goes down through the surface
of doubt, destructive thoughts,
decisions no one dares to take*

*Honesty is humbleness
Looking in that mirror
with open eye and mind
Beyond the clouds of confusion*

*Facing your fears
Embrace them and they will
disappear*

*Clear the skies, you will encounter
You, up there
Maybe we can join you too?*

*A Ranks researcher
29/01 1996*

FOREWORD

This report is the output of *three studies* that were carried out under the Dutch funded project titled "Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan". The overall objectives of this project are: *i) to develop* and implement a set of improved management strategies *and* techniques that can reduce *the* aggravating effects of irrigation on waterlogging and salinity; *ii) to expand* the institutional capacity to *effectively* manage the *solutions*, *and iii) to maximize the* role of farmers and rural communities in irrigation *management for increasing agricultural production*.

In order to reach these objectives, collaboration with national partners is aimed for in all the research components of the project. It is assumed that 'success stories' cannot be achieved if national partners are not actively involved in or supportive to the innovation processes that are hoped to be achieved by the project. Nowadays **IIMI's** interest in participatory research methods is increased, In the hope to be able to enhance this collaboration.

Rapid Appraisal of Agricultural Knowledge Systems (RAAKS) entails participatory action research. The assumption underlying the RAAKS-methodology is, that agricultural innovation is not a straightforward, technical process. Instead, it is considered to be the outcome of social interaction between many stakeholders who are interdependent, but at the same time pursue their own strategic objectives. Studying development processes, using the RAAKS methodology, may help in improving the generation, exchange and utilization of knowledge and information for agricultural innovation. Therefore **IIMI** Pakistan choose this methodology, to study and better understand the present developments in the irrigated agriculture sector in Pakistan. After a RAAKS in April 1995, three studies of six months each were commenced by three Junior Researchers from The Netherlands and counterparts in November 1995. The start of the research went along with a RAAKS training in December, wherein many **IIMI** researchers and agency staff participated.

The (intermediary) results of the studies have not always been welcomed with enthusiasm. The inability to get the collaborators-to-be grouped around the discussion table voluntarily, was not seldom attributed to a lack of experience or unrealistic high expectations of this approach. For me, the strength of these three studies lies in the fact that throughout the study, the researchers were motivated and destined to reach their objective, that is to establish real participation and - even more - to sensitize the potential for it. Their achievements should be seen as the result of an interactive process and of an approach that is characterized by a strong belief in the significance and necessity of real participation to realize sustainable development. The questions

that logically follow from these studies are: what exactly do we expect from collaboration and how can we get there?

This report gives a detailed description of the different 'actors' that play a role in irrigated agriculture and their interests. The three action researches in various fields of irrigated agriculture, give a realistic impression of what one might expect of Inter-agency collaboration. The report shows that fighting for real participation is skating on thin ice. It demonstrates the extensive negotiations, the inevitable concessions that had to be made along the way and the agreed-upon starting points **for** change. I recommend this report to anyone who is concerned with irrigated agriculture in Pakistan and its present developments.

Cris H. de Klein
Associate Expert (Social Organization)

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A RAAKS study cannot be considered separately from the people that participate in it. We want to thank all the people who worked with us and supported us in completing the RAAKS studies. Some people we would like to mention specifically.

We are very grateful to Cris de Klein. for coordinating the three RAAKS studies. You provided substantial and critical input during the research process, supported us in tough times and shared happy moments.

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Thanks to Pierre Strosser for taking the initiative to apply RAAKS in the IIMI context.

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Special thanks to the drivers for bringing us (and our heavy luggage) safely to and from the field stations. We shared peaceful moments at times when stress was building up. Thanks for listening to our stories and songs.

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Lahore, May 16, 1996

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GENERAL INTRODUCTION

BACKGROUND

With the introduction of Participatory Rural Appraisal (PRA) by Anouk Hoeberichts in November 1994, IIMI's doors were open for participatory methodologies. In the context of Hoebericht's research, Monique Salomon, staff member of the Department of Communication and Innovation Studies of the Wageningen Agricultural University, together with Anouk Hoeberichts and Pierre Strosser, conducted a three-day workshop for IIMI staff in April 1995, on Rapid Appraisal of Agricultural Knowledge Systems (RAAKS). The outcome of this workshop was a visit report on the possibilities of applying RAAKS in two of the three research components of the Dutch-funded project 'Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan'. The three research components comprise: the Operational Management component; the Institutional Development component; and the Salinity Management component. The Operational Management component consists of two sub-components: Main System Management and Watercourse Management. The Institutional Development component comprises three sub-components: Water User Associations (WUAs); Coordination Irrigated Agricultural Services; and Institutional Support for **WUAs**. The Salinity Management component includes three sub-components: Soil Chemistry; Rechna Doab; and Sindh. The three RAAKS studies were related to the Main System Management subcomponent; the WUAs subcomponent; and the Watercourse Management subcomponent. During the workshop, an initial Terms of Reference was prepared by IIMI staff for application of RAAKS in each of the three research sub-components. The three RAAKS studies are hereafter referred to as RAAKS studies in: 1) the Main System Management subcomponent; 2) the Institutional Development component (instead of the WUAs subcomponent); and in 3) the Watercourse Management subcomponent.

In March 1995, IIMI requested the Department of Communication and Innovation Studies to compose an interdisciplinary team of researchers with experience in the RAAKS methodology to conduct a RAAKS study in the three subcomponent?.. The selected team consisted of Nathalie Roovers (MA Cultural Anthropology), Jos van Oostrum (MSc Tropical Animal Husbandry) and Derk Kuiper (MSc Biology). In each subcomponent the RAAKS study would focus on the possibilities for building a collaboration between IIMI and line agencies (particularly On-Farm Water Management, Agricultural Extension, Irrigation Department). The Terms of References for the application of RAAKS in each of the sub-components are referred to in the three RAAKS studies (see Chapter 3, 4 and 5).

The three RAAKS studies started in November 1995 and were concluded in May 1996.

In December 1995, at the onset of the RMKS studies, a ten-day RMKS training was organized. The training was facilitated by Monique Salomon and Stephan Seegers (RAAKS consultants). The objective of this training was to introduce IIMI staff and line agency staff to the RAAKS methodology, and to motivate staff involved in the three research components to participate in the RAAKS studies by forming three RAAKS research teams. Furthermore, the training was considered to be a first step in the context of this new approach, bringing people from line agencies and IIMI together. The RAAKS training provided a solid basis for the RAAKS studies, which continued up to their completion in this report. The RAAKS researchers jointly conducted the RAAKS studies with a RAAKS counterpart in each subcomponent,

OUTLINE OF THE REPORT

Chapter 1 elaborates on the RAAKS methodology. For more detailed information, the reader should refer to the 'RAAKS Manual, Draft Version 5.2 (Engel *et al*, 1995)' and the 'Training Workshop Report on RAAKS and its use in Irrigation Management Research (IIMI, 1996)'. Chapter 1 concludes with some apparent and exemplifying issues related to the process of conducting a RAAKS study.

Chapter 2, Section 2.1 describes IIMI, line agencies, and other parties involved in irrigated agriculture. In RAAKS these are called 'actors'. An overview of characteristics and actualities of the organization is given, followed by a detailed outline of the tasks and activities of actors within these organizations. Additionally, external factors that influence the irrigated agriculture system are summarized in Section 2.2. The description of the actors and factors create a general picture of the social environment in which the three RAAKS studies were conducted.

Chapters 3, 4 and 5 describe the process and outcomes of the three RAAKS studies in the Main System Management subcomponent, the Institutional Development component, and the Watercourse Management sub-component, respectively. The outline of all studies relate to the three phases distinguished in the RAAKS methodology, which all consist of analytical perspectives (windows) used to collect and analyze the information from relevant actors. After the application of a window, observations and conclusions are given. The difference between observations and conclusions is that observations are based on the information gathered during the research, and conclusions are the interpretations of those observations. The conclusions provide the first step to the following window or subsequent phase in the analysis. All three RAAKS studies end with overall conclusions, in which the conclusions on all applied windows are integrated, and recommendations, which are

¹ Both reports are available at IIMI Pakistan

based on the overall conclusion

GUIDELINES FOR READING

The three **RAAKS** studies described in Chapter 3, Chapter 4, and Chapter 5 can be read separately because both the research process and outcomes are elaborated. The research process is (largely) depicted in Boxes in order to clarify why the researchers took certain decisions; which events and people had an influence on the direction of the research, etc. The research outcomes (observations, conclusions, recommendations, etc.) are discussed in the text. For all studies, however, it is recommended to first read Chapter 1, because it provides some essential background knowledge on the **RAAKS** methodology. It also puts the **RAAKS** studies in a more theoretical perspective by elaborating the concepts, principles and operational objectives underlying the **RAAKS** methodology. If the reader is interested in the social environment in which the studies were conducted the authors suggest reading Chapter 2 before diving into the studies. However, the separate studies contain sufficient information on **the** social environment to be read separately from Chapter 2. Chapter 2 could be used as a work of reference. Finally, it is emphasized that everything stated and written in this report is based on interpretation of qualitative information gathered during **the** research process by the **RAAKS** researchers. The outcomes of a **RAAKS** study are subjective. Therefore, this report does not represent an objective truth, but it reflects the valuable ideas and insights of all people involved in the studies. This report is a discussion paper and by no means a final statement.

1 THE RAAKS METHODOLOGY: I+A+P = M

1.0 INTRODUCTION

Rapid Appraisal of Agricultural Knowledge Systems (RAAKS) is a participatory action research methodology. RAAKS has been developed at the Department of **Communication** and Innovation Studies of the Wageningen Agricultural University. It consists of a set of methods and tools which can be applied to analyze and understand complex problem situations and design desired actions. It can be used to support an individual desk study, the product of which often is a report. But in the context of this research, RAAKS comprises much more. In the three case studies conducted for **IIMI** Pakistan, the implication of introducing RAAKS was that all people involved in the **RAAKS** studies went through a joint, participatory learning process and they designed actions in order to solve the problem situations under scrutiny.

FWAKS uses techniques (e.g. semi-structured interviewing and participatory observation) common in social science and, as in social science, the information gathered, the analysis of information, and conclusions are subjective. The conclusions are based on confronting and synthesizing views of different people. However, RAAKS does not stop here. The (intermediary) conclusions are only one step in an ongoing process of redefining the problem situation, coming to an understanding of the solutions, and taking consequent action. The goal of this process is to solve a common felt problem.

This Chapter reflects on the RAAKS methodology as such and on the research process which is based on 'learning by doing' experiences of the RAAKS researchers in three RAAKS studies. First, the intentions, the analytical framework, and the procedural framework of RAAKS, which together shape the RAAKS methodology, are clarified. Secondly, an overview is given of the concepts and principles underlying RAAKS, followed by three operational objectives of RAAKS. Finally, an elaboration on some key issues that illustrate the RAAKS process in the three RAAKS studies is given.

1.1 THE RAAKS INGREDIENTS

In the Training Workshop Report (p. 22) a formula is given which assumes that the intentions (I), the analytical framework (A), and the procedural framework (P) of RAAKS are the essential ingredients of, and therefore shape, the RAAKS methodology (M): **I+A+P=M**. The dependent variables (ingredients) in the formula are elaborated below to provide a clear picture of RAAKS as an action research methodology.

1.1.1 INTENTIONS (I)

Intentions are the total package of concepts, principles, and overall objectives of RAAKS in relation to the actual context and specific objectives of a RAAKS study, which are described in Section 1.2. The intentions constitute the foundation of the RAAKS methodology. The intentions are strongly related to the expectations of the different parties involved in the RAAKS study. Through negotiation between the client (i.e. IIMI Pakistan) and the RAAKS researcher, a valid set of intentions can be formulated and put to practice during the actual research. Discussions on what the 'level of participation' should be for the different parties involved in the research, relate to these intentions. Discussion on the intentions continue throughout the research as it is imperative that the people involved in the research internalize some of the RAAKS principles.

I

1.1.2 PROCEDURES AND PRACTICALITIES (P)

The procedures and practicalities relate to the process of organizing the RAAKS research. Ideally, the study is carried out by a multi-disciplinary team consisting of persons with experience in applying RAAKS and persons who are directly related to, and knowledgeable of, the problem situation and its socio-cultural environment.

The procedures also include the collection of information. There are various ways to gather information (preceding the analysis of the problem situation): interviews, informal discussions, participant observation, project documentation and literature.

After each important step in the analysis, it is essential to communicate the findings, and discuss them with all the parties involved. In this way, the necessary feedback is incorporated and validity is gained. By involving relevant people in the research, collective decision-making can be achieved on the basis of findings on issues related to, for example, the (change in) direction of the research. Thus, RAAKS seeks to stimulate a joint learning process among the people involved in the problem situation.

Other procedural and practical issues include the allocation of staff, resources, facilities and time to the RAAKS research. Based on the intentions (read: expectations of all the parties) there is a discussion on the issues mentioned above. During the course of the research, the direction of the research might change, and therefore the demand on, for example, resources might increase. This calls for a renegotiation on issues that were agreed upon with the client. The main actor in this ongoing decision-making process is the client who has initiated the RAAKS study, defined the objectives (Terms of Reference) of the study, and can provide the necessary support.

1.1.3 ANALYTICAL FRAMEWORK (A)

The analytical framework in RAAKS is represented in Figure 1.1 (adapted from RAAKS Training Workshop Report. 1996).

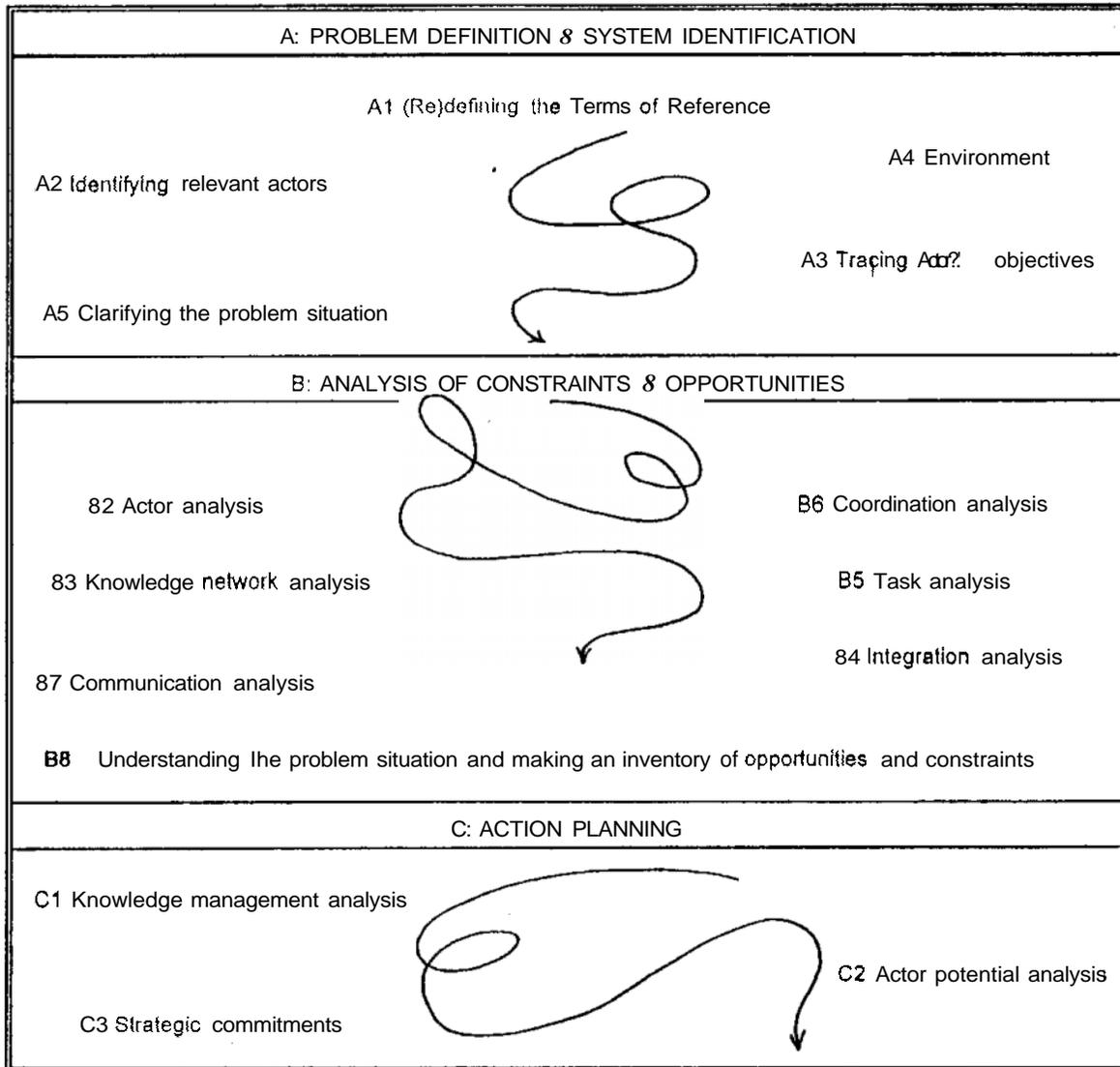


Figure 1.1: RAAKS analytical framework

In the analytical framework, three phases are distinguished:

- Phase A: problem definition and system identification;
- Phase B: analysis of constraints and opportunities; and
- Phase C: action planning.

Each phase comprises several 'windows'. Windows are analytical perspectives which help researchers to focus their attention on correlations between different sources of information and specific issues. Windows assist the researcher in addressing critical questions related to these correlations. The windows are applied and modified according to the situation under scrutiny. All windows comprise several tools that help the RAAKS researcher to systematically gather and process information. A tool is the practical way to address a particular window. As windows can be adapted and modified, also tools can be adjusted according to the questions the researcher wants to address.

All windows in Phase A have to be addressed to ensure a proper definition of the problem situation. In Phase B, the researcher selects windows on the basis of criteria defined and justified within the given context. In Phase C, all windows have to be applied for an adequate action planning. Although the three phases are depicted in a sequential research process and time frame, it does not imply there is a linear sequence that should be followed. In practice, the researchers are always reviewing previous steps in the analysis, adjusting former conclusions, negotiating previous decisions, and formulating action among themselves and with the client.

1.2 CONCEPTS, PRINCIPLES AND OBJECTIVES OF RAAKS

1.2.1 CONCEPTS

During the research process, concepts used by the researchers are constantly put to the test in real life situations. For example, the interpretation and definition of 'commitment' differs from one person to another. Therefore, it is useful and clarifying to define the concepts as used and interpreted by the RAAKS researchers in this report and, more important, during discussions with people involved in, and related to, the RAAKS studies. An overview of the most important concepts is given below.

An Actor is anyone who plays a role in, and thus influences, the irrigated agriculture system. Actors may be individuals, groups or organizations.

Commitment is an active interest in, and support for, reaching a specified goal through a (participatory) process. It is an engagement that restricts freedom of action; to bind oneself to a course of action. Active interest is expressed by taking initiatives to meet and discuss, by exchanging information, and keeping track of the process. Support can be both material (time, resources, facilities and knowledge) and social (giving feedback, appreciation of the research and research team). This means that a person (an actor) can contribute to the (research) process by giving either material or social support.

Environmental **(f)actors** are those **(f)actors**, whose influence on the system cannot be controlled or assessed within the scope of the study.

Facilitation is difficult to define. Key characteristics related to facilitation are: inciting and supporting change; group and process coordination; negotiating; conflict management; monitoring and evaluation; communication with and between individuals or groups; training; awareness building; group **dynamics/team** building. etc. However, an individual person is not able to address all these elements, which pleads for a team of facilitators.

Innovation is something new that requires and incites social change (change in ideas and actions).

Participatory working is working together and collectively deciding on roles and rules for working. Everyone has her/his own responsibility. Everyone can take the initiative, though coordination by someone may be necessary. For participatory working, there must be something common, like an issue, a problem, a purpose, or an interest. Involvement is achieved through communication and sharing resources (adapted from Training Workshop Report, 1996, p. 21). This implies:

- * being aware of one's dependence on others for solving a felt problem;
- making explicit individual interests;
- * trying to find a common interest;
- * defining a common objective;
- * expressing the willingness to compromise in order to reach the common objective;
- and
- * expressing support for maintaining the process.

Process, outcome and output

A process is a series of changes or events; a course of action; or a series of operations used in making something.

An outcome is the (visible) result of an event or a process; in the case of research these are the findings.

An output is the product of a process of mental or physical work, in the case of research, an output is, for example, the report.

Realities are the different views people have of the environment in a problem situation, which is expressed in their behavior. The nature and number of solutions an actor perceives is restricted by his/her reality.

A System is a representation of a part of the world we focus on. Within its imaginary boundaries, we look at activities and the interaction of people in order to understand mutual dependency. The decision to regard someone as an outsider or insider is based on how we perceive our influence on other people's behavior and vice versa. Drawing this boundary is a strategic decision.

Terms of Reference, research questions and the analytical framework

A Terms of Reference (ToR) are the specific objectives of a client translated in a task or an assignment. The specific objectives of the assignment are derived from a general (higher, long term) objective. The assignment is appointed to the researchers. Often, a justification is given of how the assignment is related to the general objective (i.e. of a project). In order to design the research, the TOR is analyzed and specific research questions are deduced. Research questions specify what is to be studied. Defining and justifying how these questions can be answered is the basis for the analytical framework. The combination of the answers on the what, how and why questions is called the analytical framework.

A Window is an analytical perspective that helps RAAKS researchers to focus their attention on correlations between different sources of information and specific issues. Every window consists of several tools that help the researchers to gather and process information systematically.

1.2.2 PRINCIPLES

The RAAKS methodology is based on a set of principles of a scientific and philosophical nature. The underlying principles of RAAKS are summarized below (as presented by the RAAKS researchers during the RAAKS Exchange Workshop, February, 1996):

- 1 Reality is subjective, constructed and interpreted by each individual;
 - 2 The focus is on all people involved in a problem situation;
 - 3 Goal of RAAKS is change towards improvement;
 - 4 This change needs joint commitment, thinking, decision-making and action;
 - 5 By analyzing (i.e. monitoring and documenting) the process of interactions between the people involved, an answer will be given to the question why the desired outcome could or couldn't be reached;
 - 6 R M K S analyzes ideas and capacities of all people involved and integrates these
-

into one picture;

- 7 On the basis of this picture, a common basis for understanding and action is created in order to make desired change possible; every little step towards this change is a collective responsibility and accomplishment;
- 8 RAAKS is a means, not an end; and
- 9 RAAKS provides only a framework and a number of methodological tools; it is the people using RAAKS who give meaning, content and value to this framework and tools. That is why the RAAKS manual will always remain a draft version.

1.2.3 OBJECTIVES

The three operational objectives of RAAKS comprise:

- 1 To identify opportunities for intervention aimed at improving the way social actors organize themselves to achieve innovation;
- 2 To create awareness among relevant social actors with respect to the constraints and opportunities which affect their performance as innovators or change agents; and
- 3 To identify (potential) actors who (may) act effectively to remove constraints and make use of opportunities to improve innovative performance (adapted from RAAKS manual 1995: p. 19).

1.3 DOING RAAKS

Some characteristics of applying RAAKS 'in the field' are given to illuminate the theoretical picture of RAAKS that is sketched above. These characteristics are derived from the three RAAKS studies which provided insight in the practicalities of doing RAAKS.

Box 1.1: Doing RAAKS in order to understand *the* process.

Doing and going through RAAKS yourself is essential and imperative to a proper understanding of what is needed (conditions, environment, facilities, commitment). and what the opportunities and constraints are to applying the RAAKS methodology.

1.3.1 RAAKS IS CONDUCTING INTERVIEWS

Interviews are an important element of RAAKS. In the first place, the RAAKS researcher conducts interviews to collect information related to the problem situation. These interviews tend to have the character of a meeting, which seems to originate from the fact that RAAKS is an action oriented research methodology, RAAKS researchers are always looking for opportunities to design actions for improvement of a problem situation. Meetings, as such, have a more 'problem solving' character than interviews. The distinction between a meeting and an interview in RAAKS is therefore artificial.

1.3.2 RAAKS IS A CONTINUOUS CYCLE

RAAKS in the field requires a continuous 'feedback loop' to previous steps and decisions made in the research process. During the process of gathering information, the problem situation seems to become more detailed and complex. These insights and details could consequently prove that previous decisions need to be adjusted. Recalling and making explicit previous decisions is an important aspect of the RAAKS research process. Often, the client feels very uncomfortable with recalling decisions because it is perceived to be a drawback in the research. However, in the case of RAAKS, this cyclical process of coming back to previous steps and decisions is indispensable for obtaining the necessary insight in the problem situation. An example of a 'feedback loop' in decision making is the approximation of the problem situation at the end of phase A, after which the first 'loop' of the diagnosis is considered closed. However, it is also necessary that the RAAKS researcher is, and remains, flexible in addressing the initial Terms of Reference and research questions again. This clearly shows that defining a more workable and realistic definition of the problem situation, and thus redefining and scrutinizing the Terms of Reference is imperative to doing RAAKS in a proper way. Sometimes, as in the Bahawalnagar case, the Terms of Reference is finalized just before the final analysis starts. 'Looping' is a general feature of RAAKS; a phase is never completed. On the basis of new information, the researcher might decide to return to the previous phase.

1.3.3 RAAKS IS WORKING TOGETHER

RAAKS is a participatory methodology which implies that the people engaged in the application of the RAAKS methodology work together. The process of working together is restricted by the limitations people face in terms of knowledge, time, resources and facilities. In all three RAAKS studies, the RAAKS counterparts faced a time constraint which, for example, resulted in the fact that in two cases the analysis in phase B was done by the RAAKS researcher alone.

Box 1.2: Statement of an IIMI staff member involved in a RAAKS study.

"People doing RAAKS should not be preoccupied with other activities. They need 100% of their time to concentrate on RAAKS. If you cannot fully participate in a RAAKS study, you will misinterpret information or distort the analysis."

1.3.4 RAAKS IS FLEXIBLE

The RAAKS analytical framework appears to be quite fixed, but in practice the phases and windows comprising the framework can be applied in a flexible manner. The windows are not the sole analytical instruments to identify and support opportunities for the solution of the problem situation. Through intensive discussions, the design of new windows, and the combination of existing windows, etc., the analysis gains in depth and the researchers gain more insight. A good example of the flexibility of the RAAKS methodology is derived from the RAAKS study in Hasilpur. in which an 'ideal research cycle' was designed and used as an analytical tool.

1.3.5 RAAKS IS DIFFICULT

The application of the analytical perspectives (the windows and tools) is difficult for all people involved in a RAAKS study. All RAAKS counterparts mentioned that they considered the RAAKS methodology to be useful, but that they were unable to apply and select the windows for the analysis. In other words, the principles of RAAKS are clear but when these principles have to be made operational in the windows, RAAKS loses its transparency.

2 THE ACTORS AND THE ENVIRONMENT

2.0 INTRODUCTION

This chapter sets the social context for the three RAAKS studies. The social context can be divided into the actors and the environment in which the actors act. In the first section, all of the actors who play a role in one or more of the RAAKS studies are presented. Every actor works in and/or for the irrigated agriculture system of Punjab. In the second section, the environment that influences the behavior of the actors is described. The environment is divided into: political and economic environment; socio-cultural environment; Organizational culture and performance; and the physical environment. The researchers chose to compile this information in one chapter to avoid unnecessary overlap, and draw a comprehensive picture of the actors and the environment.

2.1 THE ACTORS

Each actor is presented, firstly as an organizational entity and secondly, in terms of specific groups or designations. For each organization the overall objective(s) are defined. The description of the organizational structure is limited to that part of the organization which is relevant to the RAAKS studies. Furthermore, some striking characteristics and actualities regarding the organization are mentioned. Designation, tasks and activities of those individual actors involved in the RAAKS studies are specified in a table.

2.1.1 INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE (IIMI) PAKISTAN

IIMI is an autonomous, non-profit international research and training institute, supported by the Consultative Group on International Agricultural Research (CGIAR). IIMI's overall objectives are: 1) to generate knowledge to improve irrigation management and policy making in developing countries; 2) to strengthen national research capacity in the field of irrigation management; 3) to support the introduction of improved management and policy making. With its headquarters in Colombo, Sri Lanka, IIMI conducts research programs in many developing countries, many of which are situated in Asia.

IIMI Pakistan has the aim to foster development, dissemination and adoption of lasting

improvements in the performance of irrigated agriculture in Pakistan. Its overall objectives are: 1) to organize (design & conduct) research on improved irrigation management in irrigated agriculture; 2) to provide opportunities for professional development (of IIMI staff and staff of relevant agencies and institutes). The Head Office in Lahore is at the top of the organizational structure. It is accountable to a national Consultative Committee representing the Pakistani government and IIMI HQ, Sri Lanka. At Head Office level, 7 field stations located in South Punjab and Sindh are supervised and managed. The overall objective of the field stations is to plan, coordinate & implement research activities.

Characteristics and actualities

- IIMI has a broad spectrum of research, covering a wide range of research activities:
- IIMI is characterized by a large community of students, mainly from France and The Netherlands;
- * IIMI's research programs have a blueprint character: pre-designed targets have to be reached through a linear sequence of steps set within a fixed time frame:
- * Some higher level staff often state that IIMI's policies and programs are donor-driven, leaving little room for modifications in budget allocation or time frame;
- * Strong emphasis is on publishing research results, to add to the knowledge base on the irrigated agriculture system, for clients, including donors, national governments and the international research community;
- * Characteristic of the current research policy is the shift towards implementation and dissemination of research results (intervention) and integration of research programs;
- * There is a big geographical distance between the Head Office and field stations, which affects communication and increases dependence on transport facilities and logistic management;
- * On the Head Office level there is no specific position which covers general management (administration and personnel). General management tasks are performed by the Administrative Management Committee (AMC) consisting of 4 members from support staff, headed by 1 international staff member:
- * IIMI is a multi-cultural organization, with a clear distinction between national and international staff. Most national staff speak English, most international staff *do not* speak local languages: Urdu, Punjabi, or Sindhi;
- * IIMI has been undertaking its research activities in a specified arena, and maintains a functional network. IIMI has not yet embarked upon the existing national knowledge network.

The tasks and activities of relevant actors in IIMI are specified in Table 2.1

Table 2.1: Tasks and activities of relevant actors in IIMI

Actors	Tasks and activities
<p>IIMI Head Office</p> <ul style="list-style-type: none"> - Director - Component Leader - Research Staff - (Junior) Researchers / students - Supporting Staff 	<p>to manage administrative and research policy matters; to communicate with IIMI Head quarters, research institutes and national agencies; to secure funding and resources for new and ongoing research projects; to set the research agenda and design overall work plan for all components.</p> <p>to manage administrative and research-related matters within a specific component; to design research agenda and operationalize work plan for the component; to coordinate and supervise research activities within the component; to design and conduct research; to publish research results: to stimulate professional development of (inter)national research staff.</p> <p>to design and conduct research in a specific component; to publish research results. to assist in setting the research agenda; to train and monitor field staff in data collection and analysis, report writing: to stimulate professional development of national staff; to supervise (junior) researchers and students.</p> <p>to design and conduct research; to report and present research results.</p> <p>to support proper functioning of IIMI (administration, transport, maintenance etc).</p>
<p>IIMI Field Station</p> <ul style="list-style-type: none"> - Field Team Leader - (Senior) Field Assistants 	<p>to manage and coordinate field staff and activities; to prepare fortnightly account statement and book keeping: to train and monitor field staff in data collection and analysis, report writing; to establish and maintain relations with line agency officials; to communicate with and report to IIMI Head Office; to manage administrative matters of field station; to maintain communication with Head Office and line agencies; to train line agency field staff, to supervise students; to design ToR for students (occasionally); to receive and brief visitors/missions.</p> <p>to collect and (partly) analyze data;*to establish and maintain relations with farmers and line agency field staff; to train and guide newly recruited field staff and students; to support field team leader in administrative matters; to process documentalion.</p>

2.1.2 PUNJAB IRRIGATION DEPARTMENT (PID)

The PID is the government agency that manages the irrigation system in the Punjab Province. The foundations for this management are rules and regulations that are for a large part based on the Canal and Drainage Act of 1873 (which was amended several times). The overall objective of the PID is to ensure the equitable distribution of water to the cultivators in the Punjab. The Department is headed by the Minister and the Secretary. Ten Chief Engineers (CE) reside in ten Zones. Five of these CEs are in charge of functional Zones (e.g. CE Research of the Irrigation Research Institute) and are based at the PID Secretariat in Lahore (see PID Lahore in Table 2.2). The other CEs have Canal Offices in the 'field' and have territorial power over a Zone (see Table 2.2: PID Operational). Below the level of the CE the tasks of PID staff are more operational and less supervisory (see Table 2.2: PID Field level). Each Zone consists of several Circles headed by a Superintending Engineer (SE). A Circle is again divided in Divisions that are headed by the Executive Engineers (XEN) who supervise the Sub-divisional Officers (SDO) who manage the Subdivisions.

Characteristics and actualities

- PID officials frequently state that the high infiltration of politics as the main cause of the department's malfunctioning: 'the system is technically sound, but the system's management is dominated and constrained by non-technical factors':
- By July 1996 the PID will be transformed into an autonomous body: Provincial Irrigation and Drainage Authority (PIDA). Whether or not this transformation will enhance the performance of the present day PID is the subject of continuous debate among politicians and PID staff. Most PID officials have serious doubts about any amelioration;
- The PID has a very hierarchical and bureaucratic setup. Strict assignments and rules are accorded to every designation;
- * Total staff of the PID is 50,000!

The tasks and activities of relevant actors in PID are presented in Table 2.2

Table 2.2: Tasks and activities of relevant actors in PID.

Actors	Tasks and activities
<p>PID Lahore</p> <ul style="list-style-type: none"> - Secretary - Consultant Regulation Office - Irrigation Research Institute (IRI) - Executive Engineer Coordination (XEN) - Government Engineering Academy (GEA) 	<p>is the administrative head of the Department</p> <p>to allocate water to all the Divisions according to the Water Apportionment Accord by passing orders to the headworks.</p> <p>to provide PID with research results concerning the design of canals, groundwater tables, etc.</p> <p>to coordinate donor funded projects (World Bank, USAID).</p> <p>to train newly recruited irrigation managers for the post of SDO: to train SDOs, XENs and SEs when they go for promotion.</p>
<p>PID Operational</p> <ul style="list-style-type: none"> - Chief Engineer Bahawalpur (CE) 	<p>to supervise and monitor the work of Superintending Engineers, Executive Engineers and Sub-divisional officers by conducting monthly meetings; to handle administrative and financial matters concerning the management of the irrigation system in the Zone; to report to the Secretariat in Lahore; to maintain the IIMI-PID collaboration.</p>
<p>PID Field Level Operations</p> <ul style="list-style-type: none"> - Superintending Engineer (SE) - Executive Engineer (XEN) - Sub-divisional Officer (SDO) 	<p>to supervise XENs to ensure that all activities in the Circle are carried out (operation, maintenance, regulation and revenue collection); to report to CE.</p> <p>to supervise SDOs; to supervise and ensure revenue collection; to report to SE and CE.</p> <p>to supervise the executive staff to operate, maintain and regulate the distribution in his subdivision; report to XEN.</p>
<p>PID Field Level Lining</p> <ul style="list-style-type: none"> Executive Engineer Lining (XEN) Sub-divisional Officer Lining (SDO) 	<p>to supervise the administration of the Lining Office for the Fordwah Eastern Sadiqia (South) Irrigation and Drainage Project</p> <p>to prepare activities that are connected to the lining of irrigation canals: supervise the work that is under construction, report to XEN Lining.</p>

2.1.3 PUNJAB AGRICULTURE DEPARTMENT (PAD): ON-FARM WATER MANAGEMENT

The On-Farm Water Management Directorate (OFWM) was established in 1977. as a wing of the Department of Agriculture. Its overall objectives are: 1) to increase irrigation efficiency at the watercourse level; 2) to improve agricultural productivity through the provision of extension services on water management issues; 3) to stimulate the involvement of water users in improvement and maintenance of watercourses through establishment of Water User Associations (WUAs)

From the onset OFWM has been provided funding, initially by the U.S. Agency for International Development (1976-'81), which was followed by funding from the World Bank, the Asian Development Bank and the OECF of Japan.

Characteristics and actualities

- * OFWM is target-oriented in the planning and evaluation of activities. Performance assessment is based on a preset number of watercourses to be lined within a specified time period.
- * There are no institutional links between OFWM and PAD Extension at the field level. although both wings are engaged in extension activities.
- OFWM is currently conducting a pilot study within the Fordwah Eastern Sadiqia South (FES(S)) Project. The main thrust of this World Bank-funded project is to explore and develop possibilities for Participatory Irrigation Management (PIM) in Punjab. The overall objective of the pilot study is to organize and train farmers at watercourse and distributary canal level for the establishment of active and sustainable WUAs and Water User Federations (WUFs) at the watercourse and distributary level, respectively.
- In the FES(S) project area, rules for cost-recovery of lining have been changed recently, due to budgetary constraints. Formerly water users had to pay 30% of costs after completion of lining activities. Now, this 30% (which will most probably be raised to 35%) has to be paid in advance. The consequence is a considerable reduction of applications for watercourse lining in the area. The target number of watercourses to be lined has been reduced as well.
- The department has recently introduced laser land levelling machines, which are located at demonstration plots and can be leased by farmers on a short-term basis. Laser levelling the land has been shown to substantially increase irrigation efficiency and crop productivity.
- * OFWM has developed strong ties with IIMI, reflected in a constant information exchange, frequent (formal and informal) meetings and joint activities. One OFWM official is currently working on secondment for IIMI. with the main task to further develop and keep record (i.e. documenting) of collaborative liaisons between IIMI. OFWM and other line agencies. Another OFWM official is mainly concerned with

research on **flow** measuring devices and irrigation scheduling.

The tasks and activities of relevant actors in OFWM are mentioned in Table 2.3

Table 2.3: Tasks and activities of relevant actors in PAD: OFWM

Actors	Tasks and activities
<p>PAD OFWM: Lahore</p> <p>. Director General Agriculture (Water Management)</p>	<p>to design and coordinate water management plans; to supervise administration and staff; to facilitate communication between the Secretary and lower levels; to communicate with donors and related agencies</p>
<p>PAD OFWM: Field Level</p> <p>. Project Director FES(\$) Project (Water Management Coordinator Training)</p> <p>Water Management Specialist (WMS)</p> <p>Agricultural Officer (AO)</p>	<p>to coordinate and monitor social organizing activities for the development of WUAs and WUFs in the command area of two distributaries. to supervise administration and staff; to report to higher levels about progress; to communicate with donors and related agencies on field level; to convene meetings and field visits for visiting officials (i.e. donor missions).</p> <p>to manage and coordinate field staff and administrative matters; to report to higher levels about progress; to coordinate lining activities in the field; to supervise the establishment of WUAs; to check on cost-recovery of lining; to supervise extension activities in the field and on demonstration farm; to attend field meetings with farmers on organizational and lining issues.</p> <p>to identify farmers and select demonstration sites; to manage the Demonstration Center (DC); to provide extension services to farmers in the field and at the DC; to demonstrate PLL machine.</p>

2.1.4 PUNJAB AGRICULTURE DEPARTMENT (PAD): EXTENSION

Agricultural Extension (**AE**)'s overall objective is to improve agricultural productivity through dissemination of modern technology to farmers.

PAD is headed by the Secretary of Agriculture. The Director General (DG) supervises several Directors Agricultural Region (**DA**). The Deputy Directors (DD) are posted at the head of agricultural districts. The Extra Assistant Director Agriculture (EADA) has one Tehsil (comprising approximately **54** villages) under his jurisdiction. He supervises

field staff consisting of: Agricultural Officers (AO; in charge of Markaz level, comprising 18-22 villages); Agricultural Inspectors (AI); Field Assistant (FA; in charge of 5-9 villages); Beldars and office staff.

Characteristics and actualities

- * Since 1988 AE applies the Training and Visit (T&V) model, introduced by the World Bank. Research institutes provide technology packages, which are translated into extension messages and conveyed to contact farmers (\pm 8 farmers per village). Technology is tested and will disseminate 'naturally' among farmers' community (demonstration effect). Problems of farmers and field staff are discussed fortnightly in T&V training sessions;
- * AE is characterized by strong links (in terms of communication of problems, information, etc.) among staff at field level, and weak links between field staff and higher-ups;
- * There is no institutional link or coordination of activities between AE and OFWM at the field level. Although both wings belong to the same Department and are involved in extension activities;
- * AE has a strong link with private input suppliers. Private input suppliers have their own demonstration plots and specific knowledge on their products. AE is invited by private input suppliers to farmers' meetings in order to provide technical advice:
- AE faces serious budgetary problems, which have a strong impact on the task performance of field staff in that they are not able to visit all of the contact farmers in their area;
- Monitoring and evaluation of task performance of field staff is weak;
- The majority of farmers are not able to follow the advice of AE due to resource constraints (unavailability of inputs);
- AE is not problem-oriented because the agenda is set at higher levels. There are too many agents involved in the transfer of technology;
- * AE selects contact farmers on the basis of the following criteria: he should be interested; he should have some financial resources; his farm should be easily accessible, where everybody can see the demonstration; he should have a certain level of education (i.c. matrix).

In Table 2.4, tasks and activities of relevant actors in PAD: AE are given.

Table 2.4: Tasks and activities of relevant actors in PAD: AE

Actors	Tasks and activities
PAD AE: Lahore - Director General Agriculture (<i>Extension</i>)	to organize extension activities; to design and coordinate agricultural production plans in cooperation with the Secretary of Agriculture and Directors, Agricultural Region; to manage administration and staff; to implement policies related to agricultural production.
PAD AE: Office Level - Deputy Director (DD)	to prepare fortnightly message (together with DD Training and Adaptive Research Experts) and convey it to field staff through EADA (at Tehsil level); to attend the fortnightly training of field staff (on irregular basis); to manage administration and coordinate field staff activities ; to arrange a seasonal training at District level (refresher course on all crops) for research specialists and field staff; to act upon problems field staff and farmers face (communicated to him by EADA); to manage and monitor the implementation of agricultural production plans; the availability of inputs; staff requirements, etc. (communicated to him by EADA).
PAD AE: Field Level - Extra Assistant Director Agriculture (EADA) - Agricultural Officer (AO) - Field Assistant (FA) & Agricultural Inspector (AI) Supportive staff (laborers, clerks, etc.)	<p>to implement the T&V program to manage administration and coordinate field staff activities; to check performance and train field staff under the T&V program, to maintain personal contact with progressive farmers of the area and convey the most recent technology and get it adopted by farmers; to check availability and quality of agricultural inputs; to maintain a relationship with agricultural input supplying agencies; to arrange farmers' gatherings at demonstration plots (of contact farmers) for demonstration of results, and have a general discussion with farmers; to implement the agricultural production plan for Rabi and Kharif crops; to solve site-specific problems of field staff and farmers; to report site-specific problems of field staff and farmers to DD and research specialists.</p> <p>to check performance of FAs; to disseminate modern agricultural technologies (with FAs) to contact farmers; to solve problems of farmers on the spot; to assist the EADA in the performance of his tasks</p> <p>to establish and maintain contact with contact and other farmers; to spread fortnightly messages to farmers; to provide feedback to AO and EADA about their and farmers' problems.</p> <p>to support proper functioning of office and field staff (administration, transport, maintenance, etc.)</p>

2.1.5 PUNJAB AGRICULTURE DEPARTMENT (PAD): ADAPTIVE RESEARCH

Adaptive research's overall objective is to increase agricultural production by developing site specific improved technology packages. It modifies the results of applied research to an adaptable form before conveying them to farmers. The main objectives of the Adaptive Research Program are: 1) to identify farmers' problems; 2) to compile a list of suggested trial topics arising from the problems faced by farmers; 3) to evaluate and demonstrate the existing extension recommendations; 4) to develop and devise site specific improved production technology packages; 5) to maintain an effective linkage between extension, while research and minimizing the gap between potential and farmers' average yields.

In 1979, the Pakistan Agricultural Research Council (PARC) decided to coordinate adaptive research and extension in order to minimize the communication gap between research and extension. This is when the T&V system was introduced. Adaptive Research and the Agricultural Extension and Training wings of PAD had to work more closely together, especially with respect to designing and conveying the fortnightly message. Before 1979, results were only communicated to farmers via Extension, and problems from the field were fed back to the research institutes, Basic Research Center (BRC). etc. This situation has changed in that the Adaptive Research Center (ARC) now communicates directly with the farmers, it serves as a sort of intermediary between Extension and farmers (field level) and Basic Research. The two main objectives of ARC are: 1) to facilitate the communication between research and extension through better coordination; and 2) to modify the research results, provided by BRC, to local conditions.

Punjab is divided into 8 adaptive research zones (and thus 8 ARCs), which are in turn related to 6 different climatic zones. The distinctions are made on the basis of different soil conditions, cropping patterns, socio-economic conditions; etc.

Characteristics and actualities

- * ARC is not client responsive, they are not able to respond to urgent farmers' needs;
- * The quantity of farmers' demonstration plots (managed by ARC) has been reduced due to budget constraints;
- BRC has the power to set the research agenda, ARC is only conducting experiments and has no authority to change the agenda;
- ARC was evaluated by the Punjab Economic Research Institute (PERI) and World Bank consultants on half-yearly basis, when it was still a developmental project. Now, the monitoring and evaluation stopped because it is not considered relevant anymore. Evaluation is done only in the beginning, to check if objectives set have

been reached;

- In ARC, testing of results is done during the design and operationalizing of research.

2.1.6 INTERNATIONAL WATERLOGGING AND SALINITY RESEARCH INSTITUTE (IWASRI)

For the past nine years, IWASRI's overall objective is to 'coordinate and manage research' on Waterlogging and salinity throughout Pakistan, and to develop and disseminate economical solutions to the end users of research. The United Nations (UN) provides IWASRI with technical support, and is now keen to see IWASRI become involved with dissemination of research results from the various studies on waterlogging and salinity into practical advice for the farmers. Furthermore, IWASRI is preparing a national research agenda by consulting many (research-oriented) agencies and institutes. Next to the registration of current research on waterlogging and salinity, IWASRI designs annual research programs in which it **puts** forward ideas for national research. IWASRI's ultimate goal is to establish a nationwide collaboration of research agencies.

A new two year United Nations Development Program (UNDP)/IWASRI Project 'Enhancing the Communication, Environmental and Sustainability Functions of IWASRI' focuses on dissemination of technology to end users, particularly to the farmers. For this purpose, the Satiana area of Faisalabad has been selected and the project is called 'Joint Satiana Pilot Project'. This project involves the participation of farmers with eight other federal and provincial agencies. The project mainly deals with extending the use of trees and forage shrubs on salt-affected lands in Pakistan. In this project, an NGO, ActionAid has been hired for their expertise in community development. Similarly, the Netherlands Research Assistance Project (NRAP) and IWASRI have involved the participation of farmers in operation and maintenance of the drainage system in Fordwah Eastern Sadiqia (South) (FES(S)) Project in Bahawalnagar. Here also, NRAP and IWASRI have hired the services of ActionAid for community development purposes in the target areas.

Characteristics and actualities

- * IWASRI was established as a research organization but it recognizes the importance of dissemination of research results to beneficiaries. It has identified its role as catalyst to disseminate up-to-date information that the community wants;
- IWASRI involves existing extension organizations by strengthening them with this up-to-date information and by providing them the necessary incentives (conveyance, extension materials, etc.);
- * IWASRI has developed a separate Communication and Technology Transfer

- * Branch which mainly deals with dissemination of research results; IWASRI is mainly coordinating and managing research on waterlogging and salinity, but is also actively involved in research projects (i.e. the Joint Satiana Pilot Project and FES(S) Project in Bahawalnagar);
- * On an organizational level, IWASRI faces some financial constraints to work on projects involving participatory techniques. However, the two projects mentioned above have adopted a participatory development approach with the assistance of UNDP and NRAP.

2.1.7 NON-GOVERNMENTAL ORGANIZATIONS (NGOs): ACTION AID and SUNGI

ActionAid is an international non-governmental development organization working with the poorest communities in 20 countries throughout Asia, Africa, and Latin America. **ActionAid Pakistan (AAPk)** is committed to helping the poorest communities in its development areas to improve their quality of life. Its overall objective is to facilitate the empowerment of the poor through the equitable development of human and natural resources. The participation of communities in identification, planning, management, implementation and evaluation of the project is a key factor in **ActionAid's** work. The Head Office is based in London.

Characteristics and actualities

- AAPk applies participatory techniques in its programs, i.e. Participatory Rural Appraisal (PRA);
- * AAPk commits itself only to long term (ten year) development programs;
- * After years of experience in community work in the North West Frontier Province (NWFP). AAPk has recently started working on two projects in the Punjab (Bahawalnagar area, Satiana area). For both projects, AAPk's expertise and services are hired by IWASRI.

SUNGI Development Foundation works on a range of interlinked activities: community-based development, gender issues, natural resource management, village infrastructure, health and sanitation, savings and credit, action research and policy advocacy in four regions of the Hazara Division (NWFP). Its overall objective is to strengthen community based organizations to take an active part in the process of development.

SUNGI has been working on NGO coalition building in the wake of the proposed Voluntary Social Welfare Agencies Registration and Regulation (Amendment) Act 1995, commonly known as the 'NGO bill'. The passage of this bill in its original form has

many drawbacks for working freedom of NGOs

2.1.8 DONORS

In general, within the domain of irrigated agriculture, many funding agencies (i.e. Dutch Government, World Bank, Asian Development Bank) are financing many different projects. The overall objective of donors is to finance programs in accordance with their mission statement. Donors monitor and evaluate the progress and outcome of their programs and take action accordingly.

Characteristics and actualities

- Donors tend to have a lot of influence on the definition of project objectives and the time frame in which projects should reach their targets;
- Within donor organizations, different views exist on basic principles of intervention. Illustrative are the various ideas of project managers about the implementation and evaluation of similar projects within the same country; e.g. the interpretation of the principle of participation is manifold. The managers are relatively free to steer the projects on the basis of their personal principles;
- * Policy making by donors is centralized and varies with alterations in policy making personnel and trends in intervention strategies.

2.1.9 PRIVATE INPUT SUPPLIERS

Private input suppliers are those people who supply agricultural inputs like seeds, fertilizer and pesticides/herbicides. Their overall objective is to secure and increase the sales of inputs by the provision of inputs to farmers.

Characteristics and actualities

- Private companies establish good relations with Agricultural Extension to earn credibility with the farmers for their products. In this way their sales increase;
- * Input suppliers comprise: 1) large seed companies that visit the field, organize meetings, and take farmers to demonstration plots; and 2) local shop keepers that sell the inputs according to the demand;
- * Prices of agricultural inputs are not fixed by the government. Artificial shortages are created by suppliers to increase prices. Black marketing is a common practice.

2.1.10 FARMERS

Farmers' overall objectives are: 1) to maximize and secure production of crops and livestock; 2) to adapt their knowledge base to the changing social and physical environment.

Characteristics and actualities

- * Among farmers there is a diverse variety in caste, class, ethnicity, and land-holding;
- Farmers comprise a high variety of **owners/cultivators**, **owners/non-cultivators**, tenants;
- * More than **80%** of the farmers is illiterate;
- * There are constant tensions between farmers in the head of the distributary and tail ends;
- * Farmers collectively design the kachi warabandi (schedule of 'water turns).

2.1.11 COOPERATIVE SOCIETIES

Cooperative societies' overall objective is to provide loans to groups of farmers at a low interest rate for purchasing inputs.

Characteristics and actualities

- Cooperatives are often one-man societies existing only on paper. The legal framework is used for personal interest only,
- Practically, only influential people make use of this facility.

2.1.12 AGRICULTURAL DEVELOPMENT BANK OF PAKISTAN (ADBP)

ADBP's overall objective is to provide loans to farmers for financing agricultural activities.

Characteristics and actualities

- Only influential farmers have access to this facility;
- * ADBP is coordinated by PAD.

2.2 THE ENVIRONMENT

This Section describes some characteristics of the political and economic, socio-cultural, organizational and physical environment in which the studies were situated. These characteristics based on information from interviews, documents and personal experience have a strong impact on the problem situation and the actors involved.

2.2.1 POLITICAL AND ECONOMIC ENVIRONMENT

- Influential people, who have resources, large social networks, status and (physical) power can direct government policies and their execution. Corruption is everywhere.
- In the job market, supply largely exceeds demand, especially in engineering. Higher degrees (MSc, PhD) or social connections are indispensable for getting a job. Government posts often have first preference, because of status and job security (permanent contract, labor pool).
- There is a free market for agri-inputs, but prices for crops are fixed by the government. This has created an imbalance between costs and benefits of agricultural production.
- Agricultural productivity suffers from bad quality and unavailability of agri-inputs (seed, pesticides, fertilizer). Absence of fixed prices and reliable supplies for these inputs favor black marketing and skyrocketing prices during peak seasons of the farming cycle (artificial shortage).
- There are more than 20,000 national NGOs in Pakistan. An NGO can be a very profitable business.
- * Innovation in the irrigated agriculture system largely originates from, and depends on, foreign funding and development agencies.
- * World Bank, Asian Development bank and other international funding agencies attempt to direct government policy (i.e. through the introduction of Participatory Irrigation Management, Provincial Irrigation and Drainage Authorities).
- * Provincial Irrigation and Drainage Authority (PIDA): something is going to change in the governmental configuration of irrigation system management, but no one knows when, what, or how. Speculations range from complete privatization of the system to no structural change at all (only a change of name).

2.2.2 SOCIO-CULTURAL ENVIRONMENT

- * Society is strongly fragmented and hierarchical. Factions and hierarchical structures are based on caste, ethnicity, family, property (land), income, age and sex. In the farmers' community, collective action is hampered by heterogeneity in interests and social ties.

- Big landlords determine political and social relations within and between rural communities. Their power is based on family and caste ties, property and the (threat of) violence. This leads to an overall feeling of insecurity and distrust among people in every layer of society.
- More than 80% of the rural population are illiterate (for women the figure is even higher). Lack of education is seen as the main barrier to development.
- * The illiterate community is not sufficiently aware of their democratic rights or the power of having a vote. Votes are collected by anyone who can offer incentives, has social standing, or is strong in rhetorics.
- * To climb in the social hierarchy is a strong driving force for people. Ambitions are more focused on raising social status than on personal development.
- * Social relations tend to have a competitive aspect. Being the best is reflected in the number of awards that can be won in sports, education and work. This feeds envy as opposed to solidarity. As the saying goes: "I would like my neighbor's roof to come down, even if it falls on my own house."
- * People tend to base their actions on material incentives or a clear short-term benefit (risk avoidance).
- * Bigger landowners are usually not cultivators themselves. They live in urban areas and are often engaged in agri-business (marketing of agricultural products and inputs). Their land is cultivated by tenants.
- * Many government officials are landowners and have ties with the farmers' community.
- * Many farmers aspire to leave farming for a better life in urban areas. For this, educating their children has high priority.
- * People have ambivalent views about Westerners. based on certain religious or political connotations. Some regard Westerners as a neutral party, able to influence and incite reforms; others question or distrust Westerners' intentions and consider them a threat to Pakistan's political and cultural integrity. In general, however, Westerners (and Pakistanis related to them) are accorded a high social status.
- Every province has its unique socio-cultural climate. Statements or strategies relevant to Punjab often do not apply to NWFP, etcetera.

2.2.3 ORGANIZATIONAL CULTURE AND PERFORMANCE

- * Politics are an integral part of organizational culture. Political interests prevail in the decisions taken by government officials. Performance of government organizations is largely determined by the support or obstruction of politicians who have strong roots in the farming community.
- * The implementation of rules and regulations is hindered by political pressure. This leads, for example to a lack of accountability in task performance (superiors have no control over staff performance, for everyone can seek protection against

- disciplinary sanctions from influential peers).
- 'Transfer trauma': in all government organizations, people can at any moment be shifted from one post or area to another. Any shift in the political arena (i.e. change of seats in provincial government) may lead to complete re-staffing of a department or office. This creates constant instability in the social and professional life of government staff.
 - * Government salaries are not in accordance with work load and responsibilities and generally, salaries do not cover costs of living. This induces people to seek illegal ways of earning income (rent-seeking); Bribery/corruption is a 'bad necessity'.
 - Good task performance is not rewarded. This has a serious impact on a person's job satisfaction and their motivation to develop professionally.
 - Openly criticizing someone's performance is uncommon and generally disapproved of, certainly if it pertains to a person senior in post or age. Criticism is often expressed in informal teasing remarks or jokes.
 - (Un)official assignments from superiors can occur at any moment and have to be executed immediately. It is therefore difficult to plan activities and rely on any appointment. Appointments are usually cancelled (if at all) after the agreed date and time.
 - * Problems at the field level seldom have an effect on policy-making. Communication between field staff and higher levels is poor and irregular, limited to standard reporting and passing down assignments.
 - Task performance and communications are frustrated by poor communication and lack of adequate transport facilities, as well as an insecure power supply.
 - * Amendments in policy, planning and implementation within government departments can only be made at the top level (secretary and minister), not on lower levels in the hierarchical chain.
 - Acts and ordinances relevant to irrigated agriculture are not up to date (Canal and Drainage Act, 1873; Water User Associations Ordinances, 1981).
 - * Different government departments work in isolation from each other. Strict time schedules and task division make it difficult for departments to link activities.
 - * Agencies engaged in research and interventions regarding irrigated agriculture (irrigation, drainage, agronomy etc.), in general, do not link research agendas or activities; exceptions are pilot studies like the Joint Satiana Pilot Project. FES(S) project (PIM).
 - There are ±13 pilot projects running in Pakistan focused on the (possibilities of) farmers' participation in irrigation management. Exchange of information and experience between pilot projects is limited to occasional (national) seminars, published materials and incidental meetings.

2.2.4 PHYSICAL ENVIRONMENT

- The three research sites are located in South Punjab. in which extreme climatic conditions increase the hardship and risks of farming.
- * Population growth in South Punjab puts increasing pressure on land and farming.
- * Cropping intensity has been increased from 50% to 150% in the last few decades. Supply of irrigation water is based on 50% cropping intensity (half of the land is under continuous cultivation). There is an absolute shortage of water.
- * The irrigation system is fed by two main reservoirs, Mangla and Tarbela. Storage at Tarbela reservoir is rapidly being lost due to sediment deposition; in 10 years, this deposition will reach the dam.
- * Construction of a new reservoir (Kalabagh) is embroiled in a political conflict between Punjab and Sindh provinces.
- Majority of canals, distributaries and watercourses are not or Poorly lined. Water loss occurs due to seepage, breaches in the banks of channels occur due to reduced capacity because of sediment deposition combined with operating procedures that result in large discharge fluctuations.
- Waterlogging, salinity and sodicity pose a growing threat to agricultural production. Most farmers have little knowledge of **how** to cope with these processes, which they regard as irreversible.
- * Irrigation and drainage are part of the same cycle, but they are hardly addressed and tackled in an integrated way (by farmers or agencies).

3 A RAAKS STUDY IN THE MAIN SYSTEM MANAGEMENT SUB-COMPONENT

3.0 INTRODUCTION

This case study was conducted by a junior researcher (MSc Biology), with experience in the application of the RAAKS methodology, and the Field Team Leader of the IIMI Field Station Bahawalnagar. Supervision was provided by the Team leader of the Main System Management sub component, termed 'Decision Support Systems (DSS) - Punjab'. The study took place between November 1995 and May 1996. The analysis as described in this report has, for a large part been done by the junior researcher. The IIMI Field Team Leader provided the input and comments needed to produce an accurate analysis and a comprehensive description of the process and findings. The case study describes IIMI's attempt to build a collaboration between IIMI and the Punjab Irrigation and Power Department (PIPD). The main purpose of this collaboration is to implement a new technique (a Decision Support System) in Irrigation System Management. The study has a qualitative and subjective character. The information that is used was obtained by interviews with people that were considered relevant to this study. Therefore the study is built on personal statements, perceptions and interpretations. It primarily serves as a framework for discussion among IIMI staff and others, and a possible starting point for designing strategies and actions to strengthen the collaboration between IIMI and the PIPD.

3.1 BACKGROUND

In the RAAKS workshop conducted in April 1995 at IIMI-Pakistan Headquarters in Lahore, opportunities for the application of RAAKS in the three research sub-components were identified by relevant IIMI staff. For the Main System Management sub-component which is part of the Dutch-funded project 'Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan', the following was concluded:

IIMI and the Punjab Irrigation and Power Department are developing a collaborative program on so-called Decision Support Systems (DSS) that can help irrigation managers to make decisions regarding: (i) the scheduling and distribution of canal water (operation), and (ii) the maintenance of the network of irrigation canals
IIMI's role consists of providing access to generic tools and provide technical assistance to irrigation managers regarding computer softwares, hydraulic and canal operation.

As part of the collaboration a common platform needs to be initially developed for *the* different actors to agree *on* requirements for decision *support, implementation* of *the* program. definition of responsibilities. and implementation of *the* pilot study *in the* Chishtian Sub-Division and Malik Sub-Division (South *Punjab*). *In* a second step. *the* pilot study will be evaluated and an action plan developed for wider application of *DSS*.

As *the* program *needs* a strong *participation* from all partners to identify and *imple-*ment *the* pilot *study* action plan, *there* is a *need* to *use participatory methodologies*. RAAKS has *been* selected for *this* purpose and will be linked with *the* more *technical* research activities of the program' (Salomon. 1995).

During the study the main objective of the activities at the Bahawalnagar Field Station was to implement the Decision Support System **IMIS** (Irrigation Management Information System) in Chishtian and Malik subdivision. For the purpose of **IMIS** implementation, the field staff already collaborates with PIPD field staff.

Since 1993, several **IIMI** staff members have been collaborating with the PIPD in the Chishtian Subdivision and later Malik Subdivision (1995) for the implementation of **IMIS**. Until now full implementation has not been reached. At the onset of the RAAKS study, the **IMIS** implementation in Chishtian had come to a standstill and the attention had shifted towards the Malik Subdivision. In October 1995, the implementation process in Malik Subdivision was obstructed by the transfer of the PIPD official that the Field Team Leader was collaborating with. Now, the new PIPD official has taken up the collaborative work with the **IIMI** Field Team Leader. The RAAKS study concentrates on one of the aspects of the **IMIS** implementation process: the collaboration between **IIMI** and PIPD.

3.2 PHASE A: PROBLEM DEFINITION & SYSTEM IDENTIFICATION

3.2.1 TERMS OF REFERENCE

In November 1995, the following Terms of Reference (**ToR**) for the RAAKS case study was presented to the RAAKS researcher:

- Evaluate **IIMI-PIPD's** work on the implementation of **IMIS** in Chishtian and Malik subdivisions and formulate recommendations on the implementation process of **DSS** in a pilot project;
- * Work on an exhaustive inventory of potential areas of implementation of **DSS**

between IIMI and PIPD;

- * Formulate a masterplan for extension of DSS activities to other areas or other levels of PIPD.

After returning from the first field visit, the RAAKS researcher had a discussion with the Team leader on the TOR and the application of RAAKS in the Main System Management Sub-component. In the discussion, it became clear that the implementation process for a large part depends on communication and good relations between the parties that are involved. In a Discussion Paper, the RAAKS researcher proposed some issues that can serve as research questions for the RAAKS study, which were:

- * What lessons can be learned from past experiences with the IMIS implementation in Sri Lanka and Pakistan?
- * Can we identify alternatives that make the implementation process more effective?
- * How can the experiences from the Chishtian and Malik subdivisions be communicated to new projects and project staff?

In the RAAKS Training Workshop in December 1995, these research questions were brought together by the RAAKS researcher and the Field Team Leader of Bahawalnagar Field Station in the following TOR:

Identify opportunities to improve the IMIS implementation process in Chishtian and Malik Subdivision

Several persons from line agencies in the Bahawalnagar region attended this training. The training was intended to provide the participants with the knowledge and incentives to form a RAAKS Action Team to conduct a RAAKS study. Unfortunately, there was no PIPD official present that IIMI was working with in the Bahawalnagar region. The TOR was subjected to the participants of the RAAKS Training Workshop, but apparently, the participants did not feel very much related to the TOR. The result was that no RAAKS Action Team had been formed when the workshop was concluded.

Among the RAAKS researcher and the Field Team Leader, it was decided to form a RAAKS Action Team by arranging a meeting / workshop with the PIPD staff from the Bahawalnagar Circle. In the meeting the PIPD staff would be informed about the RAAKS methodology and asked to form the RAAKS Action Team. This meeting took place on January 23, 1996. Although the participants were formally invited and all invitations were personally confirmed, only one PIPD official attended the meeting. The other four officials were not present. By interviewing the one PIPD official that was

present, it became clear that the other PIPD officials were not interested in the objective of the meeting. The outcome of the effort to build a RAAKS Action Team was considered a crucial step in the RAAKS research process because it showed **that** among the PIPD there was no commitment to form a RAAKS Action Team at that moment; more in general, this meant that there was no broad organizational commitment in PIPD for the RAAKS study; the only interest for the RAAKS study was a personal interest.

These findings were presented to IIMI in the RAAKS Exchange Workshop on February 6, 1996 in Lahore. In the workshop it was decided that the three RAAKS researchers should deal with specific issues concerning the RAAKS study within the **sub**-components. For the Bahawalnagar case, this resulted in a series of meetings at Bahawalnagar Field Station about the planning of the activities for 1996 and the integration of the RAAKS study in these activities. The people present in the meetings were: the Team leader, the Field Team Leader, the Systems Analyst and the RAAKS researcher. It was decided that the RAAKS study would be conducted by a team consisting of the Field Team Leader and the RAAKS researcher and that the activities of the RAAKS study should, as much as possible, coincide with the ongoing activities of the Field Team Leader.

With respect to the TOR there has been ample debate between all of the parties involved throughout the RAAKS study. Finally, the RAAKS researcher formulated a TOR at the end of the research that covers the context and subject of the RAAKS study. This final TOR is:

Identify possibilities to improve the IIMI-PIPD collaboration for IMIS implementation in the Chishtian and Malik subdivisions and other future collaborative activities

3.2.2 RELEVANT ACTORS

The first actors that were identified were the invitees to the meeting on January 23, 1996 in Bahawalnagar. These actors have been implicitly identified on the basis of the judgement of the Field Team Leader, who had already established contacts with them. This means that beforehand no criteria had been set. Afterwards, the implicit criteria can be deduced. These were: is the actor relevant (now or in the future) for: 1) the IMIS implementation process; 2) Decision Support Systems in general; or 3) the IIMI-PIPD collaboration? Initially, only the actors in the Bahawalnagar Circle were considered relevant. Later on, just before the interviewing started, actors from the higher levels in the PIPD were added (see Box 3.1). These actors are located in the PIPD Secretariat in Lahore.

Box 3.1: Actor identification process.

The actor identification process depended for a large part on coincidence and already existing contacts:

- (1) The Systems Analyst (see actor list below) requested the RAAKS researcher to conduct interviews together with higher officials at the PIPD secretariat in Lahore. This event led to the inclusion of these actors in the research. Because these 'coincidences' have a major impact on the direction of the research, it is important for a researcher to recognize them.
- (2) Other actors were included because IIMI staff had established contacts with them.

In the list of actors below, more specific information is added to the actor descriptions of IIMI and PIPD in Chapter 2, Section 2.1. This information is particularly relevant to the Bahawalnagar case study. Among the actors in the list there are some actors (i.e. Working Group and Planning Group) that have not been described in Section 2.1. These actors are characterized extensively. In the list, all actors that have been interviewed, or officially met, are marked with (#).

Punjab Irrigation Department, Bahawalnagar Circle (PIPD BWN)

1. Sub-divisional Officer Malik Branch (SDO Malik) (#)
collaborates with the IIMI Field Team Leader of Bahawalnagar Field Station to implement IMIS in the Malik Subdivision. He is a Mechanical Engineer and therefore is given personal training on Hydraulics and system management by the IIMI Field Team Leader. He encounters difficulty in collaborating with IIMI because of a lack of institutional support from PIPD. He resolves these difficulties by collaborating with IIMI on a personal basis (e.g. in his spare time). He is willing to do this because he recognizes that he will develop professionally by collaborating with IIMI. For any official time investment in the IIMI-PIPD collaboration, he needs approval from his direct superior, Executive Engineer Sadiqia Division. He is critical on IMIS as a computerized DSS tool.
2. Sub-divisional Officer Haroonabad (SDO Haroonabad) (#)
has expressed his interest in the Training Report on the calibration of outlets in the Haroonabad Subdivision. He clearly stated that if he would know more about IIMI's expertise, he would like to collaborate on technical matters (he already

requested IIMI to calibrate some structures)

3. Sub-divisional Officer Chishtian (SDO Chishtian) (#)
was the first SDO to be involved in the IMIS implementation process which took place in Chishtian. Because the environment for IMIS implementation in the Subdivision is now less conducive than in Malik Subdivision, the process of IMIS implementation in Chishtian has been brought to a standstill. Research results that have been obtained during the years will be handed over to the SDO.
4. Sub-divisional Officer (Lining) Bahawalnagar (SDO Lining) (#)
is in the process of being deputed to IIMI. He attended the RAAKS training in December, 1996.
5. Executive Engineer Hakra Division (XEN Hakra) (#)
is the direct superior of SDO Haroonabad. He is willing to extend his full cooperation for any IIMI-PIPD collaborative activity. He clearly stated that doing research is not an objective of PIPD.
6. Executive Engineer Sadiqia division (XEN Sadiqia) (#)
is the direct superior of SDO Malik Branch. He is a member of the Working Group (see Actor 24). He does not see the necessity for the use of computers in main system management. Therefore, he is not very supportive of the IMIS implementation process. He does regard some of the steps in the implementation process important (e.g. installing of gauges and revising the discharge tables).
7. Superintending Engineer Bahawalnagar Circle (SE) (#)
is a member of the Working Group because he is the Superintending Engineer. but does not show an active interest. He is the direct superior of XEN Hakra and XEN Sadiqia.

Punjab Irrigation Department, Bahawalpur Zone (PIPD CE)

8. Chief Engineer, Bahawalpur zone (CE) (#)
has been working with IIMI for some years. He nominates the SDOs that IIMI is working with and is chairman of the Working Group and a member of the Planning Group (see Actor 23). He is the direct superior of the SE Bahawalnagar Circle. He supports the IMIS implementation process, but is of the opinion that the IIMI-PIPD collaboration should include material contributions from IIMI's side. IIMI should provide PIPD Bahawalnagar Circle with current meters. He conducts monthly meetings with the PIPD staff from the Bahawalnagar Circle.